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RESEARCH ARTICLE

A Survey of Surgical Trainees in Trinidad & Tobago Using a Robotic Laparoscopic Camera Holder

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ABSTRACT

Background: In the year 2021, the FreeHand robotic camera holder was introduced to a hospital in Trinidad & Tobago, amid strong opposition from postgraduate trainees who were concerned about diluted training opportunities. The aim of this study was to document trainees' opinions on this surgical tool before and after its use.

Methods: A self-administered questionnaire was completed by surgical trainees who had the opportunity to use the surgical robot in laparoscopic operations. The questionnaire sought data on three specific aspects: impact on training, technical aspects and perceived value for training.

Results: Six trainees answered the questionnaire after using the robot. The number of trainees who believed the robot negatively impacted training reduced from 100% to 33%. All responders reported that head movements to control the robot were uncomplicated and the docked robot was not intrusive toward instrument movement. All were willing to support the use of the robot after having used the robot.

Conclusions: This survey has revealed that surgical residents' opinions of the Freehand® robot dramatically changed after becoming familiar with its use. There is no valid reason that surgical trainees would be denied the opportunity to participate in an operation, once they have become facile with the robot.

Keywords: Robot, Laparoscopic, Training, Resident, Education

INTRODUCTION:

The Anglophone Caribbean is a resource-poor region comprised of 17 nations, including some of the poorest countries in the Western hemisphere¹. The region is still in the early stages of development in minimally invasive surgery (MIS)^{1,2}. Robotic surgery was totally non-existent in all countries of the Anglophone Caribbean until September 15, 2021 when a FreeHand® Surgical Robot (Freehand 2010 Ltd., Guildford, Surrey, UK) was introduced in Trinidad & Tobago². This robot comprises a single arm that handles the laparoscope and is controlled by the surgeon via an infrared communicator³.

In this setting, post-graduate surgical residents had become used to learning MIS through mentorship in their 4th and 5th post-graduate years (PGY4/5) under the supervision of their attending surgeons⁴. When the FreeHand® Surgical Robot was introduced, PGY4/5 residents initially objected because they thought it would reduce their training opportunities.

The aim of this study was to document the opinions of surgical trainees in Trinidad & Tobago changed before and after exposure to the FreeHand® surgical robot during minimally invasive surgery. The scope of the survey included three specific areas: impact on training, technical issues, and perceived educational value.

METHODS:

After receiving permission from the institutional review board, a questionnaire study was carried out. All PGY4/5 residents at the Port of Spain General Hospital who used the FreeHand® Surgical Robot to perform laparoscopic operations were included. Any resident who had not used the surgical robot was excluded.

Data were prospectively collected from all PGY4/5 residents who used the FreeHand® robot to perform operations under supervision of their attending surgeons between September 15 and December 30, 2022. The data was collected by a self-administered questionnaire (appendix 1) that sought information on ergonomics, user-difficulty and effective control of the robot during laparoscopic operations.

The questionnaire was administered to PGY4/5 residents before and after using the FreeHand® robot. Clinical data were not collected from the patients or operations performed in this study. All data were entered into a Microsoft excel spreadsheet and SPSS version 20.0 was used to generate descriptive statistics.

RESULTS:

There were six PGY4/5 residents at the Port of Spain General Hospital who used the surgical robot to perform a variety of laparoscopic operations under the supervision of their attending surgeons. There was a 100% response rate to the questionnaire.

Impact of the FreeHand robot on Training:

Prior to using the robot, all PGY4/5 residents were opposed to the introduction of the robot. The most common reasons cited were: it would take away the residents' experience as camera person (100%) and it would dilute their training experience by reducing the number of operations they would be allowed to perform (4/6). After using the robot, only two (33%) PGY4/5 residents believed it negatively impacted training.

Technical Issues:

The PGY4/5 residents' responses were: head movements to control the robot were complicated (0/6), controlling the robot with head movements distracted them from performing the operation (1/6) and having the robot in the operating field limited their instrument movement (0/6).

Perceived Value of the FreeHand Robot:

One PGY4/5 resident thought that having to actively think about head movements distracted him/her from concentrating on operation steps. All residents, having used the robot, were willing to support the use of the robot moving forward.

DISCUSSION:

In this short survey, we sought trainees' opinion on three aspects of the Freehand Robot, as outlined below:

Impact on Training:

Although all residents were initially opposed to its introduction, there was a significant reduction in the number of opponents (100% vs 0) after they had the opportunity to use the FreeHand® robot. Many residents had sufficient insight to admit that their initial opinions were biased and some admitted to being influenced by the negative opinions voiced by established laparoscopic surgeons, who may be less likely to transfer ideas of change to their trainees². This is a stark reminder that surgical leaders have the ability to influence residents and they should be cognizant of subtle cues that may influence their juniors.

Technical Issues:

A common criticism of the robot is that it is intrusive once docked, limiting free movement of the laparoscopic instruments, but none of the residents in this setting appreciated this as a limitation when the robot was docked in place. It may be argued that these PGY4/5 residents have limited MIS experience, and so they may not be able to compare ergonomics with and without the robot. On the other hand, if the residents train with the robot and become used to its presence, they should easily adapt to any restriction from the robot's presence.

Value of the Robot

The majority of residents agreed that the FreeHand robot was not overly complicated and all were willing to support its continued use. The dramatic change in opinions after using the equipment serves as a reminder of the oft-overlooked fact that influencers / mentors can easily transfer their subjective opinions during training⁵. This effect may have contributed to the dormancy of surgical robotics in the Trinidad & Tobago for over 20 years while it enjoyed widespread popularity across the rest of the globe⁶. It also reinforces the important principle that oppressive training environments will only increase the "brain drain phenomenon"⁷ and slow progress^{8,9}. Instead, modern surgical leaders

should encourage their residents to develop independent thinking and critical analysis skills.

In essence, the FreeHand® robot is similar to any other surgical tool. In order for one to become facile with its use, it requires an understanding of its capabilities and limitations. This can be achieved with proper training and mentorship. Several groups have shown that with structured training courses, surgical residents rapidly acquire skills and become proficient with the use of the FreeHand® robot^{3,10}. There is no substantial reason for PGY4/5 residents to believe that their mentors would deny them performing an operation solely because of the presence of any surgical tool.

CONCLUSION:

This survey has revealed that surgical residents' opinions of the Freehand® robot dramatically changed after its use. After becoming familiar with the equipment, all residents supported the use of the robot. There is no valid reason that PGY4/5 residents would be denied the opportunity to participate in an operation, once they have become facile with the FreeHand robot.

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